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E-Prescribing Collaboration in Massachusetts: Early Experiences from Regional Prescribing Projects

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Abstract Massachusetts payers and providers have encouraged clinician usage of e-Prescribing technology to improve patient safety, enhance office practice efficiencies, and reduce medical costs. This report describes three early pilot e-Prescribing projects as case studies. These projects identified the e-Prescribing needs of clinicians, illustrated key issues that made implementation difficult, and clarified the impact of various types of functionality. The authors identified ten key barriers: (1) previous negative technology experiences, (2) initial and long-term cost, (3) lost productivity, (4) competing priorities, (5) change management issues, (6) interoperability limitations, (7) information technology (IT) requirements, (8) standards limitations, (9) waiting for an "all-in-one solution," and (10) confusion about competing product offerings including hospital/Integrated Delivery System (IDN)–sponsored projects. In Massachusetts, regional projects have helped to address these barriers, and e-Prescribing activities are accelerating rapidly within the state.

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Payers throughout the country are offering pay for performance incentives for e-Prescribing. Chief information officers (CIOs) are being asked to implement e-Prescribing systems as an intermediate or evolutionary step in the rollout of complete electronic medical records (EMRs). Clinicians are contacting vendors to purchase e-Prescribing systems. However, e-Prescribing is many things to many people. Payers, CIOs, clinicians, and pharmacists differ in their definition of e-Prescribing and its benefits.

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Generally, e-Prescribing is comprised of five different functions: computerized prescribing associated with clinical decision support (such as drug-drug and drug-allergy interaction checking), pharmacy benefit eligibility checking, formulary compliance, and medication history reporting, followed by prescription routing to a retail pharmacy or mail order pharmacy.

For example, John Q. Public presents to a clinician's office complaining of gastric burning, especially after eating pizza. The clinician uses a handheld application or an electronic health record system to write a prescription for Nexium (esomeprazole). The clinician selects John Q. Public from a patient list. Once the clinician selects the patient, the software sends John's information to RxHub, a provider of medication information services founded by a consortium of pharmacy benefit management (PBM) companies, to determine his eligibility. Based on his validated eligibility, the health plan's PBM returns information regarding his formulary, copayment, and drug coverage. The formulary and copayment indicate that the clinician's initial drug selection, Nexium (esomeprazole), is a nonformulary drug. RxHub also displays formulary alternatives based on the initially selected therapeutic class. On the alternatives list, the clinician sees omeprazole is the preferred drug (formulary compliance) and selects it. After selecting it, RxHub displays a drug utilization review (DUR). The dispensed drug history reports that John had a recent prescription for the antibiotic clarithromycin that has a drug interaction with esomeprazole

and omeprazole (medication history). The clinician speaks with John and determines that the clarithromycin was taken for community-acquired pneumonia, which is resolved, and the medication is no longer being taken. The clinician writes a prescription for omeprazole. The new prescription is then routed via SureScripts, a consortium of retail pharmacies that has developed a network to electronically link pharmacies and physicians directly into the computer system of the Osco drug store.

Massachusetts has a complex and heterogeneous environment in which to introduce e-Prescribing. There are 28,000[1] physicians in Massachusetts, of whom 52% are employees and 48% are self-employed. Of the self-employed physicians, 51% are in solo practices, 5.6% are in two-physician practices, 6.9% are in three-physician practices, 22.3% are in four- to eight-physician practices, and 14.2% are in practices with eight or more physicians.[2] Every year, 83.3 million prescriptions are written in the state.[3] There are 1,064 pharmacies in Massachusetts,[4] of which 76% are SureScripts certified and 67% are currently communicating electronically with physicians (SureScripts presentation to NE HIMSS, May 6, 2005, unpublished).

Over the past three years, Massachusetts health care stakeholders have implemented a variety of regional pilots that include the five basic functional components of e-Prescribing. We describe the barriers to implementation and lessons learned, with the hope that they may be helpful to others implementing e-Prescribing projects.

Massachusetts Medical Society

In June 2003, the Massachusetts Medical Society (MMS) recognized the need to implement e-Prescribing software to improve the quality and reduce the cost of healthcare in the state. The MMS partnered with Microsoft and Quilogy to develop a prescription pad application and demonstrated the software at a stakeholder meeting in August 2003.

This early prototype demonstrated that to be implemented rapidly, e-Prescribing software must include certain basic features to ensure its success and adoption by clinicians, specifically, connectivity to both retail pharmacies and mail order, connectivity to patient eligibility status and plan formularies, and a drug database with allergy and interactions updated regularly.

These lessons learned led the MMS to begin discussions with SureScripts for retail pharmacy routing, RxHub for connectivity to PBMs for formulary checking/eligibility checking/medication history, and FirstDataBank for drug–drug interaction checking. The MMS reviewed e-Prescribing applications so that it could help with selection and offer a discount to its members. At the time, Rcopia, an application created by DrFirst, was the only product that included connectivity with RxHub and SureScripts, as well as offering the drug database from FirstDataBank.

This seemed to be a useful solution for Massachusetts physicians, but, unfortunately, there were regulatory barriers at the state level. As of October 2003, Massachusetts law permitted a printed, signed prescription to be sent via fax and not via electronic transmission. Subsequently, the MMS worked with the Department of Public Health to change the existing regulations and also with the Massachusetts legislature to update laws making e-Prescribing easier to implement to enable two-way electronic transmission of prescriptions. The new law and the new regulations went into effect in December 2003.[5]

MMS also announced a partnership with DrFirst at the end of 2003 and developed a list of e-Prescribing functionality guidelines for clinicians to use when choosing an e-Prescribing vendor.[6]

These included

1. Different implementation options that adapt to physician workflow (Web, PDA-based, and wireless prescription writing)
2. Drug–drug and drug–allergy interaction checking at the point of care
3. Patient eligibility, formulary checking, and medication history at the point of care
4. Access to a drug reference guide from within e-Prescribing software at the point of care
5. Direct, two-way connection to community pharmacy to reduce phone calls and faxes and enable automation of the renewal authorization process
6. Electronic pharmacy messaging to automate prescription renewal processing
7. Adaptation to physician and practice prescribing behavior to improve usability
8. Reasonable installation and monthly costs
9. Defined process for uploading demographics from the practice management system (PMS)
10. Ability and defined process for developing an interface with a physician's EMR
11. Process and contractual agreement for delivery of physician data upon cancellation of e-Prescribing service.

As of fall 2005, MMS members may purchase DrFirst e-Prescribing functionality for a significantly reduced rate as part of their MMS membership. Approximately 500 Massachusetts clinicians are currently using the software.

Massachusetts Health Plan Initiatives

Just as the MMS and its clinician membership began early exploration of e-Prescribing, the health plan community in Massachusetts felt a need to improve quality and reduce costs by implementing payer-sponsored pilot projects in the state.

In 2001, the Tufts Health Plan, Caremark (a pharmacy benefits management company), and Zix Corporation's PocketScript launched a pilot to distribute software to Tufts Health Plan network providers on handheld devices, enabling physicians to electronically write and securely fax prescriptions. The software was piloted at 15 physician sites by 77 primary care physicians and 36 nurse practitioners/physician assistants.

The pilot demonstrated

A reduction of 8.93 medication errors per physician per year
A reduction in the rate of increase of inpatient admissions
A decrease in hospital days
Verification that patients had filled their narcotic prescriptions for those situations in which patients would call to say prescription had been lost and needed new one
Improved provider office personnel efficiency
Pharmacist time savings

Decrease in rejection of prescriptions due to illegibility and drug interactions
Cost savings for generic over brand prescriptions.[7]

In 2002 Blue Cross Blue Shield of Massachusetts (BCBSMA) piloted e-Prescribing with Zix Corporation as the sponsoring software application, and Express Scripts Inc. (ESI), a pharmacy benefits management company. Recognizing the value of collaboration to minimize confusion in the marketplace and the possible economies of scale, BCBSMA, Tufts Health Plan, and Zix Corporation merged their efforts in 2003 to create the Massachusetts eRx Collaborative.[8] The eRx Collaborative seeks to accelerate the adoption of e-Prescribing technology in Massachusetts. As competing health plans, they have joined together in a unique collaboration to underwrite the cost of e-Prescribing to maximize the use of this technology. The underlying goals have been to collaboratively promote and enable the use of e-Prescribing in Massachusetts to improve patient safety and health care affordability, quality, and delivery.

Through the program, clinicians receive a handheld device loaded with an e-Prescribing software application, one-year license fee and support, six months of Internet connectivity (if applicable), and assistance with deployment (including training and a one-time patient data download). Participants can also access a browser version of the software from any PC with Internet connectivity.

In 2004, the eRx Collaborative invited Neighborhood Health Plan to join, and in January 2005, DrFirst (Rcopia) was selected as the second e-Rx Collaborative software vendor to expand the program and provide the prescribers with choice.[9]

Prescribers are able to create new and renew prescriptions electronically for noncontrolled substances and may transmit them to the pharmacy via electronic data interchange (EDI) and/or fax. Controlled substances cannot be sent electronically at this time, but there is still benefit from an e-Prescribing application since in many cases patient eligibility, formulary, and drug history can be accessed. In addition, interaction checking can take place for these highly interactive drugs, and the prescription detail is then stored in the application before printing and being given to the patient. When prescribing for patients in participating plans, they are able to access enhanced information, including

1. Patient eligibility
2. Dispensed drug history (DDH), including the patient's current and past prescriptions from multiple clinicians and PBMs, including ESI and Caremark via RxHub (currently no past information is available for a patient who has terminated a health plan)
3. Prescribed drug history (PDH), regardless of active or terminated status from a health plan, including all electronic prescriptions written by the prescriber for their patient; this is stored in the e-Prescribing software (DrFirst or Zix Corporation)
4. Drug–drug and drug–allergy interaction alerts
5. Formulary coverage among the participating health plans and prior authorization (PA) requirements for all their PA medications
6. Relative patient out-of-pocket cost information: currently for e-Prescribing, both Caremark and ESI provide the prescribed drug's cost information by providing the tier category for the prescription. The least expensive copayment is typically for generic prescriptions (e.g., tier 1); midrange copayment is predominantly for brand prescriptions that have proven their value (e.g., tier 2); highest copayment is typically for new prescriptions on the formulary that have exact or therapeutic options available at lower tiers along with drugs that may not be medically necessary (e.g., tier 3)
7. Drug reference guide

The BCBSMA and Tufts Health Plan initial investment in the eRx Collaborative was $3 million and the plans have continued providing financial support to increase adoption.

To further encourage e-Prescribing, BCBSMA offers a pay for performance program to participating primary care providers (PCPs). Those eligible can earn $1 out of $3 per member per month based on their e-Prescribing use. In 2004, approximately $1.5 million in physician incentive monies was awarded for e-Prescribing use out of $4 million for pay-for-performance technology use overall. Early analysis indicates that PCPs who are given incentives adopt and e-Prescribe at higher levels than other PCPs.

At the beginning of the program, practices with high-volume prescribers were targeted, but by late 2004, the focus changed to contract with any interested PCP or specialist, with targeted specialist recruitments in early 2005.

The most recent eRx Collaborative update for the end of 2005 indicates that there were more than 2.6 million electronic prescriptions transmitted in 2005 alone and three million electronic prescriptions sent through the program overall. Electronic prescriptions grew steadily throughout the year, and at the end of 2005, more than 300,000 electronic prescriptions were transmitted per month, with a record high of more than 80,000 scripts in one week. This represents a 136% increase throughout the year and a fourfold year-over-year increase from the previous year. The eRx Collaborative exceeded its goal of deploying e-Prescribing technology to more than 3,400 prescribers.[10]

Evaluation of program impact is ongoing for both the eRx Collaborative and individual health plans. Metrics include

Rate of adoption: percentage of electronic prescribers in Massachusetts, number and percentage of prescriptions sent electronically (by prescriber and overall), program attrition rates and reasons
Clinical: impact of drug–drug and drug–allergy alerts on physician behavior, physician perception of e-Prescribing, and patient safety
Financial: use of generic drugs and formulary compliance, average copayment cost for members whose providers e-Prescribe compared to non e-Prescribers, effect of incentives
Operational: prescriber office efficiencies
Strategic: number of formularies to which prescribers have access, amount of money prescribers would pay to fund e-Prescribing technology on their own, general prescriber satisfaction with the program

The eRx Collaborative is currently evaluating the best way to expand awareness and adoption of e-Prescribing in Massachusetts in 2006 with a focus on increasing EDI use to further enhance patient safety and health care efficiencies.

MedsInfo

Recognizing the need to reduce medical errors in care settings other than the clinician offices, the Regional Health Information Organization for Massachusetts, MA-SHARE, implemented MedsInfo-ED to automate the transmission and communication of medication history from six different health plan data sources to five emergency departments (EDs).

MedsInfo-ED focused on two components of e-Prescribing: identifying patients with health plan drug coverage and, if available, returning prescription medication history on that patient.

For ten months of activity, MedsInfo-ED identified patients with health coverage through the participating data sources 60% of the time and of those found at the data sources, returned prescription history 72% of the time.[11]

The feedback from the original pilot hospitals conducted through formal interviews with pilot EDs provided insight into the needs of clinicians, the difficulties of implementation, and the clinician commitment to work through start-up issues in support of this required functionality.[12] The formal interviews provide the following examples describing the environment of MedsInfo-ED at three of the pilot hospitals.

Hospital A

In this hospital's ED, there is an online medical record for patients whose primary care physicians are affiliated with the hospital. MedsInfo-ED was introduced to staff through a variety of modalities including announcements at faculty meetings, e-mail, in-service education, Web-based and on-site vendor training, and presentations. MedsInfo-ED's seamless integration with the hospital's existing electronic patient tracking dashboard facilitated the rollout. Originally, only attending physicians were allowed to access the system due to risk management concerns.

Barriers to use at this ED, as well as at others, were the requirements for active consent by patients and the difficulty in obtaining exact patient matches in the system. Despite these challenges, all clinicians reported personally using the resource, with frequency of use ranging from once or twice a month to as frequently as 50% of the time.

The use of the application was optional. Clinicians tended to access MedsInfo-ED when faced with patients with altered mental status, those who did not appear to be reliable historians, potential drug seekers, and those who were returning to the ED. Clinicians also used the system to review medications and doses with patients to reconcile the triage note with the stated medications.

Hospital B

At this hospital, MedsInfo-ED was initially viewed as a research project, but was jointly rolled out by the Emergency and Information Technology Departments. Two clinicians interviewed were aware of the rollout through training and staff meetings, but many other clinicians in the ED were not aware of it. The training did not adequately address all the workflow detail. Initially, nurses were asked to access MedsInfo-ED. Ultimately, clerks took on that role.

Clerks placed the MedsInfo-ED results printout into the patient's chart, regardless of whether the patient had been found in the databases or had a medication history. However, because there were very few patients with information in the system, mainly because few patients had private insurance and hence were not found in pharmacy benefit management databases, the ED stopped routine use of the intervention. Additional issues with adoption in the ED included the fact that most patients were known to the hospital itself, so clinicians could rely on internal systems for medication lists, and in an emergency setting, busy clinicians did not believe medication history was relevant for many types of clinical care, i.e., ''if someone comes in with a twisted ankle, I am just treating the ankle.''

Hospital C

Prior to MedsInfo-ED, patients had been provided blank medication lists to fill out in the waiting room. This hospital recently introduced computerized physician order entry (CPOE) in the inpatient setting. Training for MedsInfo-ED consisted of announcements by the ED director, posted signs, and planning meetings and individual training sessions prior to implementation. Use of MedsInfo-ED was added to the ED task checklist for each patient with direct clinician access through an icon on the Windows desktop. A core team of designated ''super users'' who helped train staff and issue passwords led to much higher use. During implementation, system use was interrupted for several weeks until the patient-matching logic could be fully explained, assuring users that false positives would not occur.

Physicians and nurses directly used the system, with frequencies ranging from twice a week to as frequently as 60% of patients on a shift. Some physicians relied on nurses to put the MedsInfo-ED printout in the chart as they have difficulties recalling their password. The registration staff used the triage acuity score to determine whether to access MedsInfo-ED for specific patients. For consenting acute patients with appropriate insurance, the system was accessed.

For those patients with printouts, the verbal medication list reported by the patient was routinely compared with the printout. Often clinicians refined the initial printout by filtering out older drugs. Finally, the printout was placed in the patient's chart.

As of December 31, 2005, MedsInfo-ED was discontinued because it was thought that the business model was not sustainable. However, MA-SHARE plans to implement a new subscription-based statewide e-Prescribing utility in mid-2006, which will provide MedsInfo-ED functionality as well as other utilities.

Implementation Barriers

Based on focus group input from clinicians and office staff, our various e-Prescribing projects have identified ten barriers to adoption and implementation of e-Prescribing.

Need to overcome previous negative technology experiences. Many clinicians have tried early e-Prescribing systems, only to be disappointed by difficulties using handhelds, poor software, and sluggish application performance. We believe that vendor applications are maturing and now there are e-Prescribing applications that are ready for prime time.

Initial and long-term cost. On average, depending on level of office technology sophistication, practice management

system capabilities, Internet connection, patient data loading, project management, training effort, devices, license, and wireless access, the cost to implement and use e-Prescribing per physician can range from $1,000 to $10,000 in the first year and $250 to $3,000 in the second year; price and packages vary by vendor and can be dependent on program and prescriber needs.

Lost productivity. Our experience is that for the first few weeks of implementation, productivity can be reduced by as much as 25% due to the learning curve of using electronic tools instead of pen and paper; however, in the long term, sustainable savings can be achieved that outweigh this up-front cost.

Competing priorities. Clinicians are "time bankrupt" and have 12 minutes to see and document each patient encounter. Adding a new technology is not always a high priority.

Change management issues. Many clinicians and their staff are resistant to change, particularly if there is even a brief loss of productivity. Lack of familiarity with technology may pose a barrier.

Interoperability limitations. e-Prescribing systems are much more useful if patient allergy lists and demographics can be automatically uploaded. Many practice management systems are isolated islands of data that cannot interoperate with e-Prescribing software. Integration with practice management systems may be an additional charge as well, and sometimes clinicians are unaware of the importance of this integration in easing use of the system.

IT requirements. Installing a wireless access point may pose security risks that are in conflict with existing infrastructure policies, i.e., hospital-owned buildings may require a higher level of wireless security than e-Prescribing vendors can provide. Sometimes the physician practice does not have appropriate equipment to facilitate use of the e-Prescribing system as part of the existing workflow. For example, if they do not have a handheld device or computer in the examination room, the busy clinician needs to use a PC outside the examination room, adding an extra step to the workflow.

Standards limitations. While the standards have progressed considerably, standards used for e-Prescribing are still evolving and will not be completely harmonized until 2007–2008.[13]

Waiting for an all-in-one solution. Clinicians may want to wait until their Electronic Medical Record (EMR) vendor supports the full suite of e-Prescribing transactions. Most commercial EMRs are in the early stages of supporting e-Prescribing.

Confusion about competing product offerings including hospital/Integrated Delivery Network (IDN) strategies. Clinicians are offered different e-Prescribing solutions by vendors, health plans, and their affiliated hospitals. They are not sure which of these competing solutions will meet their needs. In the worst case, a physician would have to implement multiple solutions (i.e., carry multiple handhelds) to meet the needs of all the stakeholders. The hospital/IDN may have plans of its own that either do not include or have future timelines for an e-Prescribing offering. Hence, it will "prevent" or discourage its physicians from using one of the early offerings.

e-Prescribing Lessons Learned

Over the past three years, we have applied significant resources to overcome these barriers. Our lessons learned include

One-on-one training and support upon initial deployment is needed to
- Set expectations
- Provide on-site support
- Teach users about features
- Customize the technology for each particular specialty
- Help users integrate e-Prescribing into their office workflow
- Troubleshoot the potential technology implementation issues

Strong marketplace sponsorship is required to move e-Prescribing initiatives forward while sustainability requires a long-term view of marketplace needs. Payers/health plans must clearly communicate the benefits of e-Prescribing as a vehicle to improve quality and affordability of care not only for the Plans, but also for the provider and the patient. A strong vision along with pay for performance incentives can be significant catalysts for the e-Prescribing movement.

Vendor monitoring and outreach is essential to ensure clinicians have functional software and hardware platforms. Proactive outreach and "high touch" support ensures that the application is used over time. There are significant gaps between those who have the tool available to them, those who are actually using it, and those who use it at a high rate.

Workload impact on the physicians. Although manual prescribing workflows are delegated to office staff in many practices, e-Prescribing is done by the physician directly. This requires an adjustment to new workflows and new workloads by the clinician. Once the e-Prescribing application is deployed, pages/calls to physicians to clarify prescription details decrease dramatically, so the initial increase in workload does stabilize over time. High-volume prescribers, generally in primary care, internal medicine and its subspecialties, as well as pediatrics and obstetrics/gynecology, tend to reap the earliest benefits. Office staff generally find their time associated with processing refills to be dramatically reduced when true electronic two-way pharmacy connectivity is available.

Need for a community-wide approach. Our experience with regional connectivity projects is that we are able to quickly implement projects that have interdependent partners via a community-wide coordinated project. Payers, providers, pharmacies, and vendors can work together on a single project plan. Our plan is to create a community utility service, the e-Prescribing Gateway, by mid-2006, which will reduce the technical and legal complexity of connecting all our business partners in the e-Prescribing workflow.[14]

Summary

Most physicians understand that e-Prescribing will reduce medical errors and will be perceived by patients as making the prescription process easier. However, they are skeptical that their office procedures will be improved or streamlined; e-Prescribing will interface/integrate seamlessly with their existing practice management software; training and support will be available; e-Prescribing data will be seamlessly

transferable to an electronic health record when they implement a more advanced clinical record system for their practice; and they will achieve a return on investment.

We have found that early-adopter clinicians can convince the majority of clinicians to adopt e-Prescribing by sharing their motivations for adopting e-Prescribing, the challenges that they needed to overcome, the hardware and software requirements, and integration into their office workflow. Resources such as vendor lists, questions to ask, and hardware and software requirements need to be readily available and in a form that nontechnical staff can read and understand. Physicians who know "why" would also like to know "when" and "how" to begin. More importantly, they want to know "who" will hold their hand once they begin.

e-Prescribing adoption and use should rapidly accelerate during 2006. With participation of government (particularly with the advent of Medicare Part D), payers, vendors, and standards organizations, the incentives are well aligned to deploy the technology. Success depends on a well-resourced rollout that takes into account the barriers and lessons learned in early deployments.[15] We believe that the end result will be an important reduction in errors and an even more substantial decrease in drug costs. Multistakeholder participation and a collaborative effort to grow e-Prescribing are also most likely to improve patient safety and enhance practice efficiencies.

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